

mollissima nesting in the vicinity of Skuas and Snowy Owls show higher survival rates of their eggs and chicks because the more aggressive predatory birds offer indirect protection by chasing away foxes that have easy access to the ducks' ground level nests. Waders and grouse species can benefit too since predation pressure is reduced with more available food.

It never gets dark during the high latitude spring and summer months. The famous midnight sun remains in the sky, dipping down to the horizon during the late hours, only to rise again soon thereafter. Night as we know it never falls, but is replaced by a kind of long twilight. As a result all the raptors including the diurnal birds of prey that normally call it a day at sunset, are out actively hunting until the wee hours. Watching a Short-eared Owl - well known for its daytime habit - glide lightly on its rather ghostly pale

wings against the mellow light, it was hard to believe the time was 22.30 hrs! Just two more months of summer were left for the bird to enjoy this year's abundance of lemmings, and for the lemmings to enjoy the nutritious plants, till the cycle turns again to perhaps a completely different situation next year.

Acknowledgements: I am grateful to Christian Steel (SABIMA, Norway) for his detailed and valuable comments, and to Arnodd Håpnes (WWF Norway) and Morten Erichsen for their expert inputs.

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Breeding Behaviour of *Nectarinia Zeylonica*

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A pair of richly coloured *Nectarinia zeylonica* was under close observation between 18th and 20th July, 2001 in my backyard garden at Hyderabad, (17.20 N 78.30 E), for prelaying activities, nest occupation, egg-clutch size, incubation rhythm etc. However the damage caused to the first clutch by large grey babblers and to the replacement clutch by the heavy gale and rains that lashed the city on 30th and 31st resulting in the collapse of the nest dashed my hopes of observing the hatching time, feeding frequency and the development of the nestlings.

The pear-shaped pendulous nest looking like a lump of rubbish hanging from the tip of the citrus plant branch was hardly 5 ½ feet from my bedroom window, thus affording an excellent opportunity for close observation. Paper bits, cobwebs, fine fibre, cotton and woolly material formed the outer wall of the nest while the inner wall was made up of fine fibre and fluffy cotton. The bottom of the nest was carpeted with silky floss. The lateral entrance of the nest with a porch above was facing North and being located in a corner, the security environment was most congenial.

The nearest tree vegetation was on the northern side road margin consisting of Rain tree (*Samanea saman*), Coral tree (*Erythrina indica*), Copper pod (*Peltophorum ferruginea*), Purple Bauhinia (*Bahunia purpurea*), Indian laburnum (*Cassia fistula*) and Gulmohur (*Delonix regia*).

The area around the nest, which includes the primary and secondary perch, was obviously their territorial limits and no pair or individual of the same species was noticed in the neighbourhood.

The nest building operations appeared to have been completed and the only activity noticed during 18th and 19th was the finishing touches being given to the nest by the female bird. The male did not assist the female either in giving finishing touches to the nest or incubation. During this period of activity the female was observed to carry out characteristic stereotyped movements such as (1) pulling the fibre and silky floss with its beak inward over the rim of the entrance, (2) tucking it into the wall under its breast (3) drawing it alongside against the wall and shaping the bottom by squatting and using its body weight (4) finishing the inner wall and padding of the nest bottom by turning round and round inside, (5) pressing its head, tail against the rim and alternately pushing with one foot and then the other against the floor and inner sides and (6) turning frequently between and sometimes during the above movements.

Nest measurements

Length	: 23 cms	Distance from the nest	
Width in the centre	: 9 cms	to the ground	: 4 ½ feet
Inside depth	: 6 cms	to the ground	: 4 ½ feet

Pre-laying activity and nest occupation

(a) Behaviour of the bird : The primary perch is on the combined canopy of curry leaves (*Murraya koenigii* or *Curraway*) Sapota (*Achras zapota*), Citrus plant (*Citrus limon*) and Guava (*Psidium guajava*). The secondary perch on the lower branch of Citrus in the immediate vicinity of the nest afforded the bird an unhindered view of the nest and its entrance. It is mostly on this favourite secondary perch that the female bird vocalized and indulged in leisurely body preening. Before approaching the nest, it vocalized everytime on the primary and secondary perches and after flitting, descended on the nest. While leaving the nest it flew off directly and sometimes hopped on the citrus and sapota branches and vocalized infrequently.

The body language of the bird like turning its head sideways, up and down and making slight body movements indicated that it was about to leave the nest. The female bird did not appear to take notice of the presence of koels, tailorbirds and the flock of large grey babblers, which frequented the same canopy.

When I imitated its call under cover, it appeared to have been slightly agitated. The female hopped from branch to branch vocalizing for nearly one minute and finding no intruder in the vicinity flew to the nest.

(b) Ferrying the nesting material : On the 18th, 15 trips were made between 8.30 am and 4.30 pm ferrying nesting material such as cotton and silky floss, while on the 19th, 11 trips were made between 9.30 am and 12.35 pm. At 9.45 am it brought a fairly large chunk and fluffy white material, which it tried to insert through the entrance. Having failed to do so, the bird took the material back on to the compound wall, tore it into small shreds and deposited them inside the nest in two trips. Between 1.55pm and 3.00 pm the bird was seen removing the excess of silky floss and discarding it outside the compound wall.

(c) Visits by male and female birds : On 19th the male visited the nest four times accompanied by the female on two occasions. During the first visit the male conducted an internal inspection of the nest along with the female, presumably to familiarize with nest location for it would undertake feeding of the young nestlings after hatching. During the other visits the male popped its head

into the nest to make sure of internal security. The visits of the female were short and random in order to ensure that everything was fine with the nest including the security environment. After the first clutch was laid, the male visited only once to have a look at the eggs to see that all was well with the clutch. That the female bird frequented the nest for incubation at intervals of 2 to 15 minutes which indicated that it was in the vicinity.

Nest occupation

The female did not occupy the nest during the nights between the 18th and 21st, though it was making short visits off and on, ferrying nesting material and checking the security environment. The first occupation of the nest was on the 22nd after laying one egg of the first clutch and regular sitting commenced from the next day.

Egg laying and clutch size

First clutch. A greenish white egg marked with light shaded brown and grey patches was laid in the forenoon of the 22nd and within 24 hours the second egg was laid on the 23rd around 11.30 am. It is characteristic of many passerine birds to lay their eggs in the forenoon. (Skutch, 1952). The eggs were short and ovate in shape. While laying the second egg the bird would stay put in the nest for full five minutes.

Measurement of the eggs

Length : 11/2 cms Width : 3/4 cm Weight : 2.5 gms



Position of eggs

Note: Arrow indicates the direction of the nest entrance.

The position of the eggs presumably indicates that both flanks of each egg receive the body heat uniformly during the incubation period.

The bird found both the eggs damaged on the 26th, started sipping the liquid contents and ferried the broken shell pieces outside. After discarding them, the bird was actively engaged in nest sanitation.

Replacement Clutch. On the 28th one egg was laid around 11.30 am and hence a close watch was kept till 9.00 pm. However the female bird did not turn up though its call was heard from the canopy around 2.45 pm. The egg lay exposed throughout the day and night. The frequent presence of large grey babblers, which haunted the canopy presumably discouraged the bird from visiting or occupying the nest.

Nest temperature

No attempt was made to record the nest temperature for purposes of comparison with the ambient temperature lest the delicate eggs and the nest got damaged.

Incubation rhythm

The female commenced incubating the eggs from the 22nd night. Egg warming was fully observed on 24th and 25th.

Day 1 (23.07.2001)

The number of attentive period between 11.30 am and 5.27 pm was 12 times and that of the inattentive period between 11.20 am and 5.43 pm was 13 times. The coverage of attentive period ranged from 2 to 15 minutes, the longest being 2.38 pm to 2.53 pm. Inattentive period coverage ranged from 5 minutes to one hour and 15 minutes, the longest was between 11.35 am and 12.50 pm perhaps for foraging. The total duration of attentive period was 80 minutes while that of the inattentive period was 303 minutes and the average of both the periods was 6.66 : 23.3 minutes. (Fig. 1,5&6).

Day 2 (24.07.2001)

The number of period of attentiveness between 6.22 am and 6.15 pm was 31 times while that of inattentiveness between 6.16 am

and 6.25 pm was 32 times. The attentive period ranged from one minute to 25 minutes, the longest was between 10.15 am and 10.40 am. Coverage of inattentive period ranged from one minute to 28 minutes, the longest was between 5.10 pm and 5.38 pm. The time duration of attentive period and inattentive period was 389:341 minutes while the mean of both the period was 12.54 minutes and 10.65 minutes respectively. (Fig. 2,5 and 6).

Day 3 (25.07.2001)

The number of attentive periods between 6.50 am and 6.00 pm was 35 times while that of inattentive period from 6.40 am to 6.12 pm was 16 times. The duration of attentive period ranged from one minute to 18 minutes; the longest was between 10.50 am and 11.08 am. The inattentive period duration ranged from 5 minutes to 25 minutes, the longest being 4.30 pm to 4.55 pm. The total duration of attentive period was 299 minutes while that of inattentive period was 393 minutes. The mean of both the periods was 8.54 minutes and 11.22 minutes respectively. (Fig. 3,5 &6).

Day 4: (26.07.2001)

The number of attentive periods between 6.50 am and 3.41 pm was 29 times while that of inattentive period between 6.40 am and 3.40 pm was 29 times. Attentive period duration ranged from one minute to 25 minutes, the longest was between 6.50 am and 7.15 am while that of inattentive period ranged from one minute to 20 minutes. The longest period of absence was between 1.40 pm and 2.00 pm. The total period of attentiveness was 289 minutes while that of inattentiveness was 252 minutes. The mean of both the periods was 9.95 minutes and 8.62 minutes respectively. (Fig 4,5 &6).

The duration of attentive period on the 23rd was less than that of inattentive period. However on the next day it showed an increase over the inattentive period. The bird kept the eggs covered 50.5% of the time duration of 12 hours. On the 25th the attentive period was 94 minutes less than that of inattentive period. The egg coverage was 42% of the time duration of 12 hours. Possibly the wet day marked by an off and on drizzle might have affected the egg coverage. The damage caused to the eggs on the 26th had obviously upset the incubation rhythm.

Possible cause of egg damage

The bird was noticed sipping the liquid contents for a total period of 49 minutes with frequent intervals between 3.52 pm and 5.09 pm. It ferried the broken pieces of eggshell between 5.10 pm and 5.15 pm and 5.20 pm and 5.25 pm for discarding outside. However the actual disposal site could not be pinpointed as the view was obstructed by the vegetation and compound wall. After discarding it was actively engaged in nest sanitation. The bird left the nest at 5.29 pm disturbed by the large grey babblers but did not return though its call was heard at 6.16 pm.

The vociferous and quarrelsome large grey babblers were fiercely fighting frequently on the branch right on the top of the nest and several times the female sunbird was reluctant to return to the nest. It was evident that the battling babblers had caused the egg damage.

Nesting season

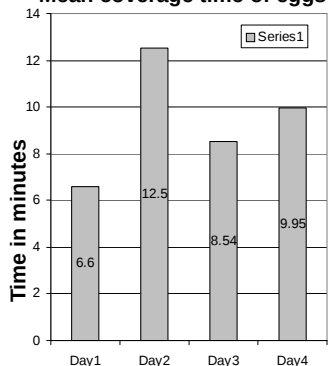
Writing about the nesting season in his "The Book of Indian birds" Dr. Salim Ali states that the season is not well defined (1941, 1964, 1979, 1996 editions) and that nests may be found in practically every month. (1941, First edition). Subsequently Dr. Salim Ali and Dillion Ripley (1987) have elaborated that there is increased breeding activity from March to May in Bengal and from February to April in Southern India with a second peak from July to September in the latter region where this species breeds freely after the monsoon. The specimens collected during the

Hyderabad State Ornithological Survey by Salim Ali in October, 1925 and 1931 in Saifabad and Mannanur indicated that they were breeding in October also. Two specimens collected at Narasampet in December, 1931 showed that they had reverted to non-breeding. (Specimen Nos. 425 & 426). In Poona, Benjamin Aitken found eggs hatching in March while Douglas Dewar recorded number of nests in the same month in Madras. In the Konkan region, Salim Ali found breeding season between July to October. Dr. Bharucha stated that they frequently use period flanking the monsoon in March-April and July-August. Among many passerine birds two or more clutches a year are common (Olin Sewall Pettingill, Jr. 1985). Dr. Uttangi has concluded that the purple rumped sunbirds of the Western Ghats breed during Jan-February. There is however no reference to laying of the second clutch though mention is made of a second brood between July and September. I presume that the damage caused to the first clutch has prompted the bird to lay a replacement clutch.

Important observations

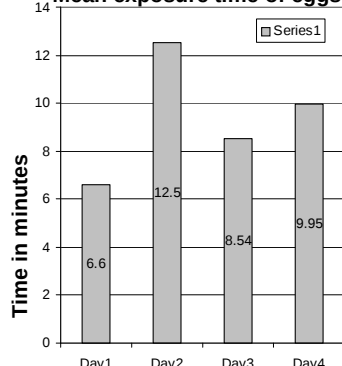
1. The female bird has a red iris while the male has a brown iris.
2. The female bird has utilized two days to give final touches to the nest.
3. It made short visits off and on for two days before egg laying to make sure about the suitability or otherwise of the nest and the surrounding security environment for raising a successful brood.
4. After the first clutch was damaged, one egg was laid on the second day.
5. The female bird does not appear to have been under stress after discovery of damaged eggs and it went about cleaning the nest and laying the replacement clutch.
6. The male bird was seen only once after the first clutch was laid and it never turned up when the damage to the eggs was discovered.

Mean coverage time of eggs

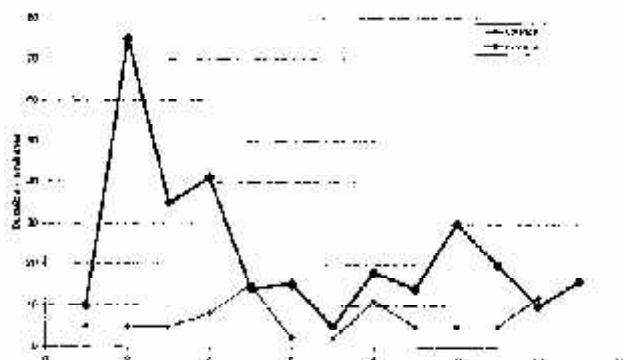


Figures 5

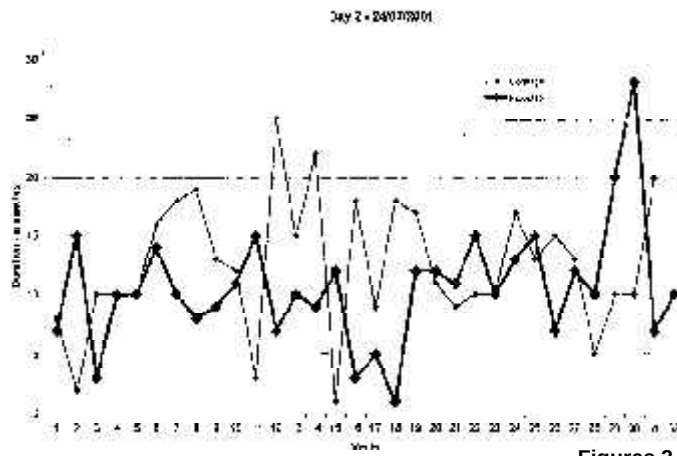
Mean exposure time of eggs



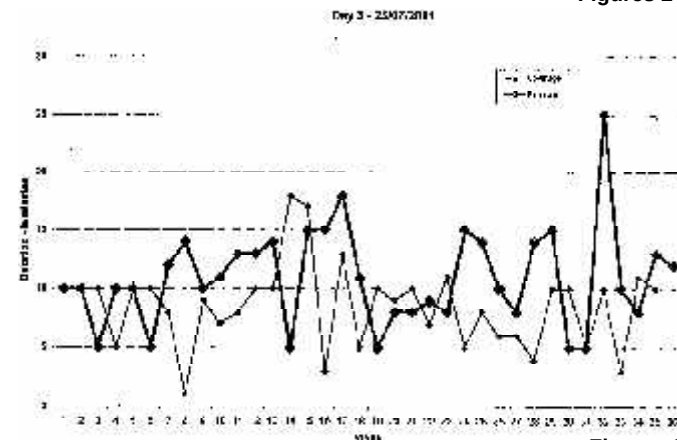
Figures 6



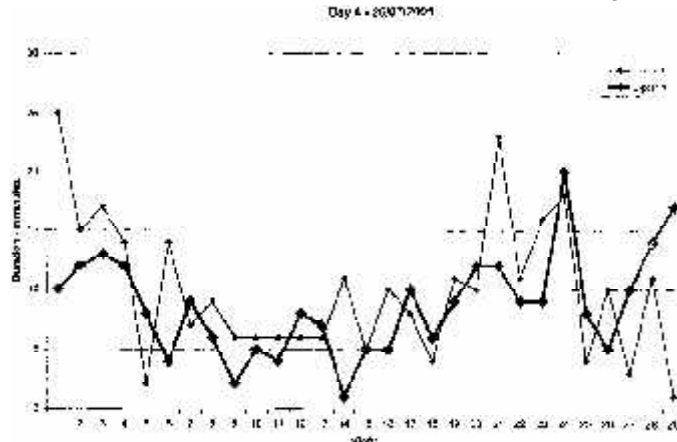
Figures 1



Figures 2



Figures 3



Figures 4

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